

SECTION (I)

QUESTION NO: 03

(A)

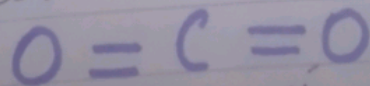
Chemical Bond Formation: Covalent Bond in Water

Introduction :-

There are millions of chemical compounds exist in nature. All these compounds are made up of atoms which are held together by a force known as bond. There are various types of bonds. Water has polar covalent bond.

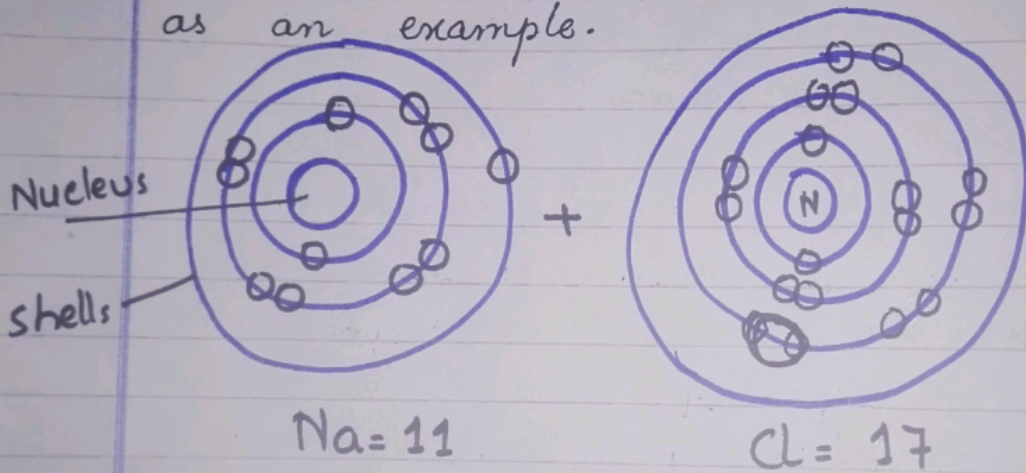
Why an atom forms Bond?

There is variety of compounds present in the world all are made up of atoms, a smallest particle. These atoms are joined together by a force known as Bond. For example CO_2 .

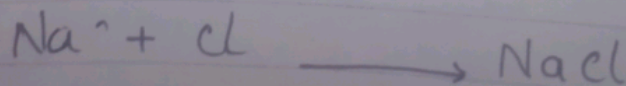


The double small lines between

atoms are known as Bond. Bonds are formed in order to gain stability. As each atom has to follow octet rule, by which it gains stability. So, to attain stability an atom forms bond with other atom. Let's take Sodium chloride as an example.



As Na (sodium) has only 1 electron in outer most shell and chlorine has 7 electrons. Sodium will donate its one electron to chlorine. By this both atoms will attain stability.

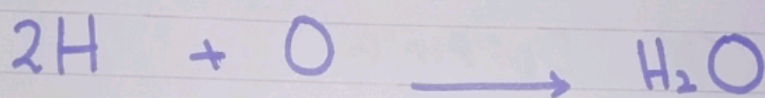


There are various forms of bond such as Ionic, covalent, Dative

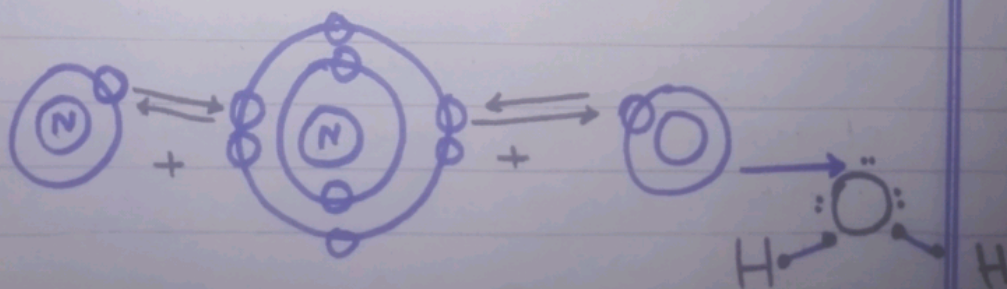
or coordinate covalent bond, metallic bond and Hydrogen bond.

Covalent Bond In water molecule

The chemical formula of water is H_2O it means it is made by of Hydrogen and Oxygen.



For Bond formation hydrogen will share its electron with Oxygen and Oxygen will share its electron with Hydrogen, this is called mutual sharing. By this a Bond is formed that is called Covalent Bond.



Conclusively, it is shown that the covalent bond exist, in water and electrons of Hydrogen and Oxygen are shared mutually.

QUESTION NO: 03
Part (b)

DOPPING

DEFINITION

Dopping refers to the intentional introduction of impurities into a pure semiconductor material to alter its electrical properties.

TYPES OF DOPPING

There are two basic types of Dopping.

- 1- n-type Dopping
- 2- P-type Dopping

n-TYPE OF DOPPING

In such type, it adds impurities with extra electron. Example, Addition of phosphorus in silicon.

P-type Dopping

It such type, addition of impurities with fewer electrons. For Example

addition of Boron in silicon.

Purpose Of Dopping

It modified conductivity of electrical Semiconductors, enabling the creation of Component like transistors, diodes and integrated circuits.

Different types Of Ceramics

CERAMICS

Non metallic, inorganic materials, that are typically hard, brittle and heat resistant. They are made by shapping and firing natural or synthetic raw materials.

For Example, Procelain, glass, bricks

Types Of Ceramics:

Traditional Ceramics

They are made from natural raw materials like clay.

Example: Bricks, Procelain

Uses: Construction, Pottery, household items

Advanced Ceramics

They are made using refined powders and advanced processing.

Example: Alumina, silicon carbide

Uses: Electronics, aerospace

Refractory Ceramics

They can withstand high temperatures.

Example: Fire bricks, magnesia

Uses: Furnance, kilns, thermal insulation

Glass Ceramics

They have unique optical and mechanical properties.

They are used in cookware, optical devices and dental restorations.

Bio Ceramics

They are used in medical applications.

Example: Bioglass

Uses: Bone implants, dental restorations

— QUESTION NO: 03 — (C)

Merits and Demerits Of Global Warming

Global Warming:

The rise in temperature of earth due to build up of green house gases, is known as Global warming. According to IPCC, since 1850 to 2024, the earth's temperature has been risen up to 1.2°C .

Merits Of Global Warming

Although Global warming is a major threat but it has several short term merits too. few are discussed below.

Increase in Duration of season

Due to Global warming, the length of season increased, the warmer days may benefit

Cold regions.

Shipping Routes due to Melting Ice

Due to increased temperature the arctic ice is melting as a result new shorter shipping trade sea routes are discovered.

Increased exploration to colder regions

The polar region's resources are exposed which are great economic opportunities.

Colder areas get benefited:

Colder areas get benefits as they costs is reduced heating or lower temperatures.

Demerits Of Global Warming

Rising Sea level:

Coastal areas face floods due to rising sea level as ice caps are melting.

Extreme Weather Patterns

The increased hurricanes, drought and heatwaves disrupts lives and economies.

Loss of Biodiversity

Due to high temperatures species are unable to adapt and faces extinction.

Food Security Threats

Changes in climate patterns disrupts agriculture, it lead to shortage of food.

Health Risks

Due to rise in temperatures, Disease like Malaria, dengue spread which causes health risks.

Questions no: 03

Polio:

DEFINITION:

Polio is a disease also called poliomyelitis, it is caused by Polio virus. Virus affects nervous systems, leading to Paralysis in severe cases.

Symptoms

- Fever
- Fatigue
- Sore throat
- Stiffness in neck and back
- Muscle weakness
- Paralysis

Causes

Polio Virus spread through

- Contaminated food
- Water
- Direct contact with infected
- Poor sanitation and hygiene.

Challenges in Eradication OF POLIO

Lack of awareness

More than 40% of population is illiterate, lack of education about importance of vaccination contributes to low immunization rates.

Security threats to Polio workers

Recent incidents with polio workers created a fear and security concerns among polio workers specially in conflict prone regions. It serve as major barrier in vaccination access.

Misconception among People

People have misconception regarding polio vaccine, that it causes infertility or other health risk. Due to this they refuse to have vaccine.

Religious and Cultural Barrier

Religious misconception is found among people and they view

Polio campaigns with suspicion considering them foreign agendas against religion or culture.

Overburdened Health Care System

Limited resources and poor health care facilities affects immunization campaign resulting in improper access to vaccination.

Improper Access to Vaccine

Due to poor infrastructure remote areas devoid of access of vaccination, this cause hindrance in vaccine distribution. Hence, the eradication of polio seems as challenge.

The above discussion proved that polio is a big challenge for Pakistan and its eradication is still not possible due to various causes.

— QUESTION NO: 04 —
(A)

Short note on Bile

DEFINITION

Bile is a digestive fluid produced by the liver and stored in Gallbladder.

Composition

It contains

- Bile salts
- cholesterol
- water
- Bilirubin (waste product)

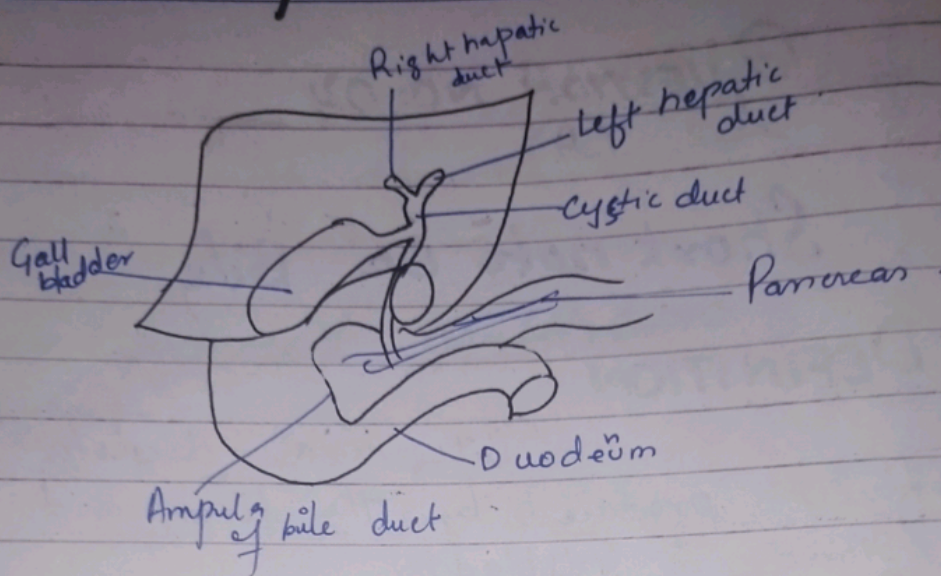
Functions

It helps in digestion and absorption of fats by emulsifying them. It aids in elimination of waste products like bilirubin from the body.

Importance

It is essential for fat metabolism and maintaining healthy digestion.

Secretion of Bile



Bile is released into the small intestine through the bile duct during digestion.

QUESTION NO: 04

B

Role of kidney in Excretion:

Introduction:

Kidney has wide roles among which Excretion is chief. Excretion refers to biological process by which organism remove metabolic waste products and toxins from their body to maintain Homeostasis.

Role of kidney in Excretion

Kidneys are primary excretory organs in humans, playing crucial role in removing waste.

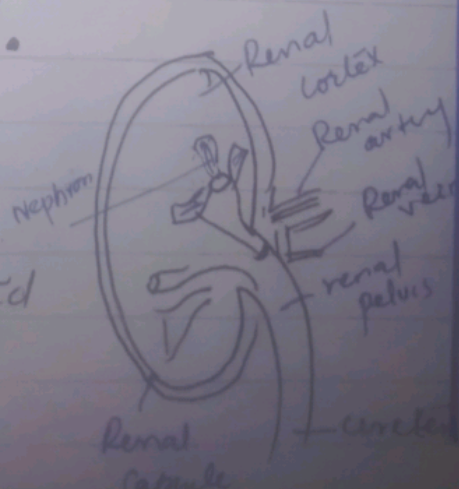
Filteration of Blood

Kidney filters the blood when blood enters through renal artery to kidney. Waste products such as salts and water are separated from useful substances.

Removal of Nitrogenous wastes

Kidney excrete urea, uric acid, creatinine, which are toxic by products of protein and muscle metabolism.

More over, kidney excrete urine that is concentrated in tubules and excreted through ureters, bladder and urethra.



QUESTION NO: 4

Methods of Solid Waste Management:

These are various methods of Solid waste Management.

DEFINITION

The process of collecting, transporting, processing, recycling, disposing of solid waste in an environmentally responsible manner.

Methods of Solid Waste Management

- 1 - Land filling
- 2 - Incineration
- 3 - Recycling
- 4 - Composting
- 5 - Waste to Energy

Land filling

In this method, waste is buried in specially designed landfills to prevent contamination of soil and water.

Incineration

Here, waste is burned at high temperature to reduce its volume and generate energy. This is most widely used method.

Recycling

In this method reprocessing of materials like paper, plastic and metals is done into new products.

Composting

Organic waste is decomposed biologically to create nutrient rich compost for soil.

Waste - to - Energy Method

In this method waste is converted into Energy by incineration and anaerobic digestion.

— QUESTION NO: 4 — (D)

Anaemia

DEFINITION : The decreased number of Red blood cell in the body or deficiency of Haemoglobin.

CAUSES : Lack of Iron, Chronic infection
Genetic disorders, Loss of blood.

SYMPTOMS :

- Fatigue
- Shortness of breath
- Weakness
- Cold hands and feet.
- Yellow skin

Treatment :

Iron supplements and Iron rich diet.

Appendicitis

Definition: Inflammation of Appendix, a tube like organ attached to large intestine.

Causes

Blockage of stool, mucus, bacterial or viral infections or abdominal injury

Symptoms

- Pain in abdomen
- Nausea and vomiting
- loss of appetite
- bloating

Spleen

Definition Soft spongy organ located in the upper left abdomen beneath rib cage.

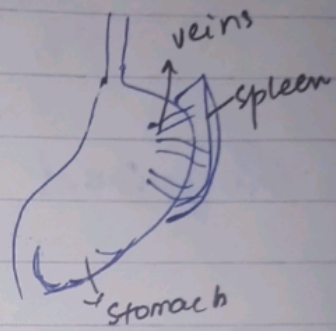
Functions

It filters blood and remove damaged RBCs

It produce WBC and antibodies to fight against infections

Platelet storage and release is also done by it.

It breaks down Hemoglobin



Myopia

Definition : Refractive error where distant objects can be seen ~~clearly~~ blurry.

Causes

Genetic, Prolong screen time, long eyeball.

Symptoms

Blurry vision, squinting, headache

Eyestrain.

Isotones

Atoms of same element with the same number of ^{neutrons} ~~protons~~ and different numbers of ~~neutrons~~ protons.

Example • Carbon and Nitrogen both have 8 neutrons. Carbon ${}^{14}_6\text{C}$, ${}^{15}_7\text{N}$

Section (II)

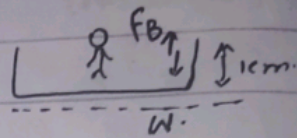
QUESTION NO: 06 (A)

Data

$$\text{Length} = 3 \text{ m}$$

$$\text{breadth} = 2 \text{ m}$$

$$\text{Area} = 3 \times 2 = 6 \text{ m}^2$$



Required

$$\text{mass} = ?$$

Formula:

$$\text{Buoyancy Force: } F_B = \text{Volume} \times \text{density } \rho \times \text{gravity}$$

$$\text{volume} = V(\text{internal}) + V(\text{extra})$$

$$F_B = W$$

$$V\rho g = mg$$

$$m = V\rho$$

$$\because V = A \times L$$

$$V = \frac{6 \times 1}{100} = \frac{6}{100} \text{ m}^3$$

Solution

$$m = \frac{6}{100} \times 1000$$

$$m = 60 \text{ kg}$$

$$\because \rho \text{ of water} = 1000 \text{ g/m}^3$$

QUESTION NO: 06 (B)

Data

balls sold = 17.

Price (total) = 720

loss = 5 balls

Required

Cost of ball = ??

Formula

$$\text{Cost price} - \text{Loss} = \text{sale price}$$

Solution.

$$17 \text{ cost price} - 5 = 720.$$

$$12 = 720$$

$$\frac{720}{12} = 60$$

$$\boxed{\text{Cost of a ball} = 60 \text{ Rs.}}$$

Question : 06 (C)

Data:

$$\text{Present age} = 24 + \text{age of son}$$

$$\text{After two years} = \text{age of man} = 2 \times \text{son}$$

Required: Present age of son = ??

Solution

$$\text{Let, the age of son} = x$$

$$\text{age of father (man)} = x + 24$$

After two years

$$\text{age of son} = x + 2$$

$$\text{age of man} = x + 26$$

According to the question, after 2 years
age of father = $2x$ (age of son)

$$x + 26 = 2x + 4$$

$$x - 2x = 4 - 26$$

$$-x = -22$$

$$x = 22 \text{ years}$$

— Question NO: 06 (D) —

Data

Rashid takes 6hrs to type 32 pages
Kamran " 5hrs " " 40 "

Required Total time for 110 pages

Solution

~~Based~~

$$\text{Rashid} = 6\text{hrs} = 32\text{ pages}$$

$$1\text{hr} = \frac{32}{6} = \frac{16}{3}$$

$$\text{Kamran} = 5\text{hrs} = 40$$

$$1\text{hr} = \frac{40}{5} = 8\text{ pages}$$

$$\text{Both in one hour} = \frac{16}{3} + 8 = \frac{16+24}{3} = \frac{40}{3}$$

$$1\text{ page} = \frac{3}{40}\text{ hrs}$$

$$110 = \frac{3}{40} \times 110 = \frac{33}{4}\text{ hrs}$$

Time = 8hrs and 15min

— Question no: 07 —
(A)

Data: Rate = time

Loan = Rs 1200 (principle)

Interest paid = 432

Required

rate of interest?

Formula

$$\text{Interest} = \frac{P \times R \times T}{100}$$

$$432 = \frac{1200 \times R \times R}{100}$$

$$R^2 = 36$$

$$\boxed{\text{Rate} = 6\%}$$